

What is claimed is:

1. A method for detecting wear in a liner containing or bounding a flow of an abrasive fluid, comprising the steps of:

5 placing an electrically conductive wire on or near the outside surface of the liner; and
measuring the electrical resistance in the wire to determine whether the wire has worn through.

2. A method according to Claim 1, wherein the wire is placed in a zigzag pattern.

3. A method according to Claim 1, wherein the wire is placed in a spiral pattern.

10 4. A method according to Claim 1, wherein the liner is ceramic.

5. A method for detecting wear in a liner containing or bounding a flow of an abrasive fluid, comprising the steps of:

placing a thermocouple on or near the outside surface of the liner; and
monitoring the temperature measured by the thermocouple over time to
15 estimate wear in the liner.

6. A method according to Claim 5, wherein the liner is ceramic.

7. A method according to Claim 5, wherein the thermocouple is a wire thermocouple.

8. A method according to Claim 7, wherein the wire thermocouple is placed in a
20 zigzag pattern.

9. A method according to Claim 7, wherein the wire thermocouple is placed in a spiral pattern.

10. A method for detecting wear in a liner containing or bounding a flow of an abrasive fluid, comprising the steps of:

25 creating a groove in the outside surface of the liner;
placing an electrically conductive wire in the groove; and

measuring the electrical resistance in the wire to determine whether the wire has worn through.

11. A method according to Claim 10, wherein the created groove comprises a zigzag pattern.

5 12. A method according to Claim 10, wherein the created groove comprises a spiral pattern.

13. A method according to Claim 10, wherein the liner is ceramic.

14. A method for detecting wear in a liner containing or bounding a flow of an abrasive fluid, comprising the steps of:

10 creating a groove in the outside surface of the liner;
 placing a wire thermocouple in the groove; and
 monitoring the temperature measured by the wire thermocouple over time to estimate wear in the liner.

15 15. A method according to Claim 14, wherein the created groove comprises a zigzag pattern.

16. A method according to Claim 14, wherein the created groove comprises a spiral pattern.

17. A method according to Claim 14, wherein the liner is ceramic.

20 18. A method for detecting wear in a liner containing or bounding a flow of an abrasive fluid, comprising the steps of:

 placing an electrically conductive wire thermocouple on or near the outside surface of the liner;

 measuring the electrical resistance in the wire thermocouple to determine whether the wire has worn through; and

25 monitoring the temperature measured by the wire thermocouple over time to estimate wear in the liner.

19. A method according to Claim 18, wherein the wire thermocouple is placed in a zigzag pattern.

20. A method according to Claim 18, wherein the wire thermocouple is placed in a spiral pattern.

21. A method according to Claim 18, wherein the liner is ceramic.

22. A method for detecting wear in a liner containing or bounding a flow of an abrasive fluid, comprising the steps of:

creating a groove in the outside surface of the liner;

placing an electrically conductive wire thermocouple in the groove;

measuring the electrical resistance in the wire thermocouple to determine whether the wire has worn through; and

monitoring the temperature measured by the wire thermocouple over time to estimate wear in the liner.

23. A method according to Claim 22, wherein the liner is ceramic.

24. A method according to Claim 22, wherein the created groove comprises a zigzag pattern.

25. A method according to Claim 22, wherein the created groove comprises a spiral pattern.

26. A liner , comprising;

a substantially cylindrical body of a material which is susceptible of wear over a term of use; and

an electrically conductive wire placed on or near the outside surface of the body.

27. A liner according to Claim 26, wherein the wire is placed in a zigzag pattern.

28. A liner according to Claim 26, wherein the wire is placed in a spiral pattern.

29. A liner according to Claim 26, wherein the body is ceramic.

30. A liner, comprising;

a substantially cylindrical body of a material which is susceptible of wear over a period of use; and

a thermocouple placed on or near the outside surface of the body.

31. A liner according to Claim 30, wherein the thermocouple is a wire thermocouple.

32. A liner according to Claim 31, wherein the thermocouple is placed in a zigzag pattern.

5 33. A liner according to Claim 31, wherein the thermocouple is placed in a spiral pattern.

34. A liner according to Claim 30, wherein the body is ceramic.

35. A liner, comprising;

10 a substantially cylindrical body of a material which is susceptible of wear over a period of use and which defines a groove in the outside surface of the body; and an electrically conductive wire placed inside the groove.

36. A liner according to Claim 35, wherein the body is ceramic.

37. A liner according to Claim 35, wherein the groove comprises a zigzag pattern.

38. A liner according to Claim 35, wherein the groove comprises a spiral pattern.

15 39. A liner, comprising;

 a substantially cylindrical body of a material which is susceptible of wear over a period of use and which defines a groove in the outside surface of the body; and a wire thermocouple placed inside the groove.

40. A liner according to Claim 39, wherein the body is ceramic.

20 41. A liner according to Claim 39, wherein the groove comprises a zigzag pattern.

42. A liner according to Claim 39, wherein the groove comprises a spiral pattern.